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Abstract

HEAT TRANSFER AND STABILITY IN BOILING WATER REACTORS

M. Bogaardt, F.J.M. Dijkman and C.L. Spigt
Technological University, Eindhoven, the Netherlands

Fundamental work on heat removal by bubble formation and by increased heat diffusivity as a result of increased turbulence in boundary layers is being done in this laboratory.

A mathematical model has been constructed of the heat transfer loop that is in operation under pressures up to 40 atm., at input powers up to 600 kW and inlet subcooling up to 40°C. The model is compared with the experimental results obtained from the loop.

The on-set of flow instability is studied and the nature of the instabilities is characterised in the region up to burn-out by means of analysis of power density curves. Again, pressure and inlet subcooling are varied.

The dynamic characteristics of the loop are studied by means of transfer function alaysis. The validity of the underlying linearisation is discussed and the resulting transfer functions are compared with those obtained from noise analysis.

Finally, systematic burn-out studies of rod bundles are reported, including the analysis of flow instability preceding burn-out.